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“Support our networking and help us belong!”: listening to beginning secondary school science teachers

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Abstract

This study, drawing on the voice of beginning teachers, seeks to illuminate their experiences of building professional relationships as they become part of the teaching profession. A networking perspective was taken to expose and explore the use of others during the first three years of a teacher's workplace experience drawing particularly on the work of Nardi *et al* (2000) and Hakkarainen *et al* (2004). Three case studies, set within a wider sample of 11 secondary school science teachers leaving one UK University's PostGraduate Certificate in Education, were studied. The project set out to determine the nature of the networks used by teachers in terms of both how they were being used for their own professional development and perceptions of how they were being used by others in school. Affordances and barriers to networking were explored using notions of identity formation through social participation (Lave and Wenger, 1991; Wenger, 1998). The focus of the paper is on how the teachers used others to help shape their sense of belonging to this, their new workplace. The paper develops ideas from network theories to argue that membership of the communities are a subset of the professional inter-relationships teachers utilise for their professional development.

During their first year of teaching 8 teachers were interviewed, completing 13 semi-structured interviews. This was supplemented in year two by a questionnaire survey of their experiences. In the third year of the programme, 11 teachers (including those in the original sample), were surveyed using a network mapping tool (Fox, *et al.* 2007) in which they represented their communications with people, groups and resources. 3 further teachers (all in the original sample) were then interviewed specifically about their networking practices and experiences using the generation of their network map as a stimulated recall focus.

The implications of the analysis of these accounts are that these beginning teachers did not perceive of themselves wholly as novices and that their personal aspirations to increase participation in practical science, develop a career or work for pupils holistically did not always sit comfortably with the school communities into which they were being accommodated. Whilst highlighting the importance of trust and respect in establishing relationships these teachers' accounts highlight the importance of finding 'peers' from whom they can find support and with whom they can reflect and potentially collaborate towards developing practice. They also raise questions about who these 'peers' might be and where they might be found.

Keywords: social networks; beginning teachers; teacher induction; work environment

Title Page Footnote:

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Beginning teachers and their networks

Becoming a teacher is about moving into a new working environment. This transition from being either a full time student or career changer can be awkward and requires careful support. New teachers and more experienced teachers moving to a new school go through a process of acculturation which is about becoming assimilated into the existing conditions, developing an understanding of the milieu of a school and is inevitably a period of negotiation and adjustment (Tickle, 2000). However in the case of beginning teachers this period is particularly important in setting up longer term aspirations and establishing teacher identity. For that reason beginning teachers are very vulnerable and their career can be destabilized by a negative school context and culture (Flores & Day, 2006; Day *et al*, 2006).

During the course of an Initial Teacher Education (ITE) programme beginning teachers develop strong relationships. Important links are formed with lecturers, tutors and other students. During school placements other vital links are made with school-based mentors, other teachers and support staff. Furthermore, new teachers also access resources available through government agencies, professional associations and teacher support websites which inform their developing practice. Finally a further important source of support are links with family and friends, particularly, previous employment contacts.

This study investigates the nature of these webs of relationships as networks, from a teacher's ego-centric perspective. The research from which this paper is derived was funded by the Gatsby Charitable Foundation with the aim of increasing retention of secondary school science teachers. The project, which ran from 2004 – 2007, set up networks of new teachers facilitated through access to a University hosted website and supplemented by termly development days in the Faculty. By the end of the programme the network of newly and recently qualified teachers numbered 125.

Interest in networks and networking has increased (eg. Castells, 2000; Veugelers & O'Hair, 2005). Some of this has considered effective network structures (eg. Hargreaves, 2003; 2004; Burt, 2001; Watts & Strogatz,

1998); in particular using techniques such as social network analysis (eg. Scott, 2003; Palonen *et al*, 2004; Purinton & Waetjen, 2006). In an educational research context others have focussed on effective networking practices at an organisational and inter-organisational levels (eg. McLaughlin *et al*, 2008; Allee, 2003; Bell *et al*, 2006; Earl *et al*, 2006). Less often studied, beyond populist business literature such as by Gladwell (2002) and Misner & Morgan (2000), are the dynamic networking processes from an individual's perspective. By focussing on such ego-centric views of networks and networking (eg. Nardi *et al*, 2000; Fox *et al*, 2007), this paper contributes to the under researched area of new teacher networks and provides an alternate perspective to existing studies on organisational and inter-organisational networks. In particular the study has been informed by the work of Nardi *et al* (2000) who

discuss the emergence of personal social networks as the main form of social organization in the workplace.. [and] report [an] ethnographic study of the ways people wield their personal social networks to get things done at work....[which] provides a worm's eye view of the network society (Nardi *et al*, 2000, p1)

Three processes of networking are identified in this work; creating, maintaining and activating aspects of personal networks and this we sought to understand through the first three years of a sample of beginning secondary school science teachers. The questions being addressed were 'how are teachers drawing on networks for their own development?' and 'what are the issues teachers talk about that act as affordances or barriers to using their networks?'

Transition into new workplaces

Despite the growing in-school elements of teacher training programmes and the general provision of mentoring support throughout the initial year, teachers are still found to be in danger of being overwhelmed as they transfer into their first teaching posts (Lindgren, 2005; Day *et al*, 2007). While the recent UK Variations In Teachers' work, lives and their Effects on pupils (VITAE) project reported that leaders and colleagues

provided largely positive contributions to their developing sense of efficacy during the first three years of teaching, they also contributed significantly to reduced sense efficacy in others (Day *et al*, 2007). This mixed picture of the role of others in supporting beginning teachers has been documented, especially with regard to mentors, with researchers seeking to understand this particular relationship in terms of role expectations (eg. Rajuan *et al*, 2007; Remington-Smith, 2007) and negotiation of boundaries and multiple relationships (Barnett, 2008). Some of these studies have been developing Wenger's (1998) socio-cultural perspective on novices entering a community of practice (eg. Laker *et al*, 2008; Remington-Smith, 2007). Lave and Wenger's view would be of teachers that, on joining schools, they become encultured into members of communities with others in their profession. Through initially peripheral participation they learn from more experienced others, developing along a trajectory usually towards increasing expertise to more central participation and sense of belonging. This socio-cultural view believes that participation in such communities allows opportunity to experience the cultural norms and expectations of the community, which is conceptualised to be working together towards shared goals through mutual engagement in a set of developing practices. The newcomer can become increasingly aware of and then competent in such practices. This assumes strong relationships dominate within the community in which time is spent with one another uncovering tacit beliefs and helping make explicit normative practices.

Participatory perspectives also dominate the burgeoning field of workplace learning literature, which is also beginning to consider individual biographical accounts of transition into existing established social and organisational cultures (eg. Evans *et al*, 2006; Fuller & Unwin, 2004; Hodkinson & Hodkinson, 2005). Network analysis allows for notions of communities (ie. strong, proximal and collaborative relationships) to be accommodated but also recognises that weaker, ephemeral or less sustained, relationships and connections can also be valued and may be made from beyond the local community of colleagues. These ideas are based on earlier work by Granovetter (1973) who argues that weak ties are important in helping to overcome inertia

by allowing opportunities for change within organisations. Lawrence (2007) goes further suggesting that such weak ties are important in facilitating between school practice transfer and for increasing opportunity for individual career development (Marsden, 2001). Fox *et al* (2006) have proposed a matrix aligning both strength and value of weak ties or links.

The study

Research design

Initially the research design focussed on 8 teachers, chosen to reflect direct and recent graduates, together with those who have changed career. 4 had come direct from Undergraduate courses, 2 from Doctoral work and 2 from industry. 13 interviews were conducted in their first year of teaching. This was supplemented in year two by a questionnaire survey of their experiences. In the third year of the programme, 11 teachers (including those in the original sample), were surveyed using a network mapping tool (Fox *et al*, 2007) in which they represented their communications with people, groups and resources. In addition 3 further teachers were interviewed based around the generation of a network map in the form of a stimulated recall interview. An example of one of these teachers’ maps is included to exemplify the result of this mapping task.

Figure 1 about here.

It is these three teachers as case studies that are presented in this paper; each showing different reactions to workplace conditions as they perceived them.

Research methods

Data was analysed using a framework (see Table 1) developed largely from previous work identifying elements of the network as valued by the individual teacher and accommodating new themes arising from the data; most notably the relationship between networking and identity formation.

Table 1 here

Categories of ‘affordance’ and ‘barrier’ were sub-categorised as: physical, structural, cultural, relational and personal.

For each of the three cases data on links came from retrospective interviews and from the discussions focused around generation of the maps. Analysis of the transcripts, undertaken using Atlas.ti software, was carried out similarly on both. For each link identified a relative strength was allocated and these can be displayed on post-analytic representations of the network maps (see Figures 2 and 3 later). These diagrams are a re-representation of the network maps (or portions of them) drawn by beginning teachers to highlight the strength and location of links as perceived by the teachers. Each map, as expected from such ego-centred data collection and found in other work (Fox *et al*, 2007), was typically centred around the individual with nodes as named people or roles and links more or less annotated by the teachers. Nodes are grouped by the teachers into areas, which for the purposes of the representations reported here, have been referred to as hubs. These are used only to represent the classification of the nodes as organized on the maps by the teachers. Hubs do not represent that relationships are routed through these places or virtual bounded groups as is one use of the term in literature, such as relating to electronic networks eg. Watts and Strogatz, (1998), and can be considered metaphorically; more similar to the use of Hargreaves (2003) and his notion of ‘innovation hubs’.

Overall findings

The importance of in-school peer relationships

The majority of in-school links were within departments and personal professional relationships with Heads of Departments and mentors were key to the success of feeling welcomed into and part of a department. While beginning teachers named specific valued relationships within their departments, it was support from peers across school that were cited as most valued.

The impact of the Gatsby network

Of the 8 teachers interviewed all but one cited the Gatsby-funded development opportunities as valued external links. All cited continuing personal relationships with a handful of these peers, maintaining contact by email, 'phone or meeting. "Improved motivation as a result of...contact with NQTs [newly qualified teachers] and RQTs [recently qualified teachers] involved in the programme" was also noted by external evaluators reporting to the Gatsby Foundation (Mitchell *et al*, 2007).

Perception of factors affecting networking

From the interview data collected for the sample of 8 teachers *relational*, followed by *structural*, factors were most often cited as both helping and hindering networking. In terms of affordances, *relational* factors included links with staff already known at school, with senior leaders, with peers across the school (often other beginning teachers) and external links. *Structural* affordances included an effective induction programme, clear school systems, having roles that take new teachers beyond departmental boundaries, staff meetings structured to include pedagogical discourse and engagement in extra-curricular school activities. *Relational* constraints such as colleagues who were not receptive to new ideas or condescending in their responses as well as problematic relationships with colleagues mentor/ assessors. *Structural* constraints highlighted inconsistent behaviour systems, lack of support beyond the initial year and formal links being limited to the department.

The experiences of three beginning teachers

Rhiannon's case

Rhiannon is a female Chemistry and Science teacher who had moved straight from her undergraduate degree to teacher training and began teaching in an 11-16 Village College. During her first year she and her mentor

were invited to the first Gatsby-funded development day at the University, which she reported (three years later) had 'been a luxury to be able to meet up and reflect' with her peers.

However, Rhiannon's school-based mentor (also her head of Department) had not seen the value of the day in terms of meeting whole school needs and did not consent to her being released for subsequent days. As a result Rhiannon did not take an active part in network activities. Nonetheless during her first year of teaching she reported that she was developing sound relationships within her department and felt welcomed and secure;

I've been really impressed and pleasantly surprised at how supportive people are. And everybody looks out for each other and if somebody has lots of things on, they will offer to do things for you (interview at the end of year 1).

By the time she was interviewed in her third year of teaching, Rhiannon was still in this same school and was able to represent her strong, collaborative relationships with science colleagues and technical staff.

Focussing on the stronger links, she had developed a valued relationship with the experienced key stage 4 science co-ordinator, with a more experienced teacher co-teaching a new course to the school (BTec) and with another Chemistry teacher with excellent subject knowledge who joined as an NQT in her second year. Rhiannon was passionate about increasing the practical aspects of chemistry and reported how she regularly spent time with the chief technician preparing for and trialling practical activities; taking her advice on what had been used before and the limitations noted and inviting the technician into classes to help deliver the practical elements.

My technicians. They are the most, the biggest support I would say. The reason they are so good I would say is that they work throughout the science department and go into all of the lessons and to be honest I don't think I would still be in teaching if I didn't have my lab

technician. In my first year I had some awful classes and my technician would come in and, she would be so gentle and say, I would see this teacher do this to help settle the class and that might work (interview in year 3).

However in her first two years Rhiannon described her relationships as limited;

Other than the science department and the other NQTs, this school doesn't have a good networking thing going on. So I wouldn't say I know all that many members of staff outside my year team and the department (interview at the end of year 1).

Her only external links were personal ones with resources usually gathered from the internet and then adapted for use. This creation of new material was a priority for Rhiannon; which she reported to do for most classes. With time Rhiannon took on additional roles; as organiser of a summer science 'camp' for 10 and 11 years olds transferring to the school and as a co-ordinator for transition onward to post-16 opportunities. Through these she was also able to chart developing links beyond her department and, most recently, beyond school to a group of Chemistry teachers active in sharing and developing practice based on the county town. In the first case, similar to other teachers interviewed, this was due to prior relationships being built on through a further opportunity to work together. When asked why she mentioned a particular colleague as valued, Rhiannon replied that;

Rhiannon: [He] joined the school at the same time as me so in my first year we had these meetings every two weeks and, because of this, we have got quite a good relationship. Also I organise the summer school and that is something that [name of colleague] is involved with in his role for G[ifted] and T [talented] (interview in year 3).

Rhiannon also made connections with others in the school with responsibility for transition and, through discussion with the Head of Mathematics in this capacity, decided to make contact with the Head of Chemistry in a local sixth-form college. Through him she was introduced to the local group of Chemistry

teachers and, for the first time, was able to discuss practice with like-minded subject-specialist colleagues (see Figure 2).

Figure 2 about here

When asked whether she thought it was useful to become aware of other colleague's networks she reflected;

Yes. Because if there is someone you don't talk to too much then it is a good way to go through someone else like [the head of maths] to [the head of sixth-form Chemistry] as otherwise it is much more of a chance thing. And now, through [the head of maths], meeting [the head of sixth-form Chemistry] I am getting so much benefit for my subject teaching (interview in year 3)

In Rhiannon's case the beyond school links were serendipitous and as yet relatively weak yet, even in the three months since joining this group, she had attended a workshop in another school (for the first time) and was about to host the group in school to share the benefits of these links with other staff in school.

It can be reflected that Rhiannon had been encultured much as Wenger's (1998) work predicts in that she had developed increasingly strong links within her department with close colleagues either perceived as more knowledgeable or more experienced, although still relying mostly on her own independent study to develop her practice. However as Wenger *et al* (2002) themselves indicated, communities of practice can become inertial and this teacher reflected that, prior to meeting the head of sixth-form Chemistry, she knew nothing of other schools and their practice and was concerned that she was not able to consider moving school as she had no idea whether other schools were better working environments than her own; in which she now felt secure, valued and listened to.

Johannes' case

Johannes is a male Science teacher still in his original 11-18 inner-London Academy by year 3. He had taken a gap year before training to be a teacher working in London both as an insurance broker and in the Ministry of Defence. He is also part of the National Fast-Track¹ programme, which entitles him for the first four years of teaching to an external professional tutor and access to regional and national conferences. After being accredited as a Leading Teacher² he retained some science teaching, but had taken on the role of Special Needs (SEN) Co-ordinator for the school at the beginning of his third year. He reported in his first and second years many problems with individual relationships. Initially this was with his mentor and, when asked if he was supported to the degree he would like in his first year, he reported that he was not and had used his former University tutor in this mentoring role.

No. And if it wasn't for [my former University lecturer] - I would say she's mentored me more this year, more than I've been in school. Because the other thing is I do not have a lot of professional respect for my mentor, so getting advice elsewhere was obvious to me. The help I've got has been from more senior people and I deduced from what they have said but I've felt that the onus has been on me. And in a year when so much is new anyway, that's not ideal (interview at the end of year 1).

This was a typical example of other beginning teacher's reported experiences in this study feeling they needed to be proactive in getting support when they felt it was needed. It appeared they would either look for advice and opinions from teachers they already trusted and respected (in the case of the former lecturer) or from those they felt could be respected and approached (and senior leaders were cited several times by these teachers). In Johannes' case his mentor was also the head of his Science department:

¹ A programme run by the National College of School Leadership for those aspiring to leadership roles.

² From September 2007, the national expectation was that all UK schools would have access to the support of an accredited Leading Teacher in support of their able, gifted and talented pupils.

Regarding individuals, my head of department has been the hardest one I've had to develop. I actually thought it was good to begin with and then got a bit worse. And I think, if I'm absolutely honest it's because she's a bit threatened and has not had a lot of time to work with me, because she's head of department, so I've felt a bit threatened by myself (interview at the end of year 1).

In response to this barrier to Johannes' sense of feeling valued in the department, he went further and, as the next three quotes indicate, developed a direct relationship with the headteacher, to seek both to make his voice heard and to bring in new ideas to school. He described how he was having to 'feel' his way in terms of trying to develop a sense of belonging to the school which did not conform to the usual pattern of relationship building.

Johannes: Well I think the headteacher's opinion at the end of the day is what counts and his point of view is that he is interested in impacts and outcomes...That said there are a lot of tacit (is that the right word? sort of secretive?) well there is a lot of unspoken rules about what you do and don't do to get there. And I won't pretend that I am some kind of maverick because I am too conscious of the time in my career.

Researcher: I am surprised you say maverick because you seem to be so systematic actually.

Johannes: OK well I don't do things that I think will upset him but will certainly make sure that the important things pass by him (interview in year 3).

I guess we meet up about once a term and it was he who really tried to push me on to go onto the Leading Teacher thing and push me forward. There may be accusations of favouritism but I feel that actually I have chosen this school and have been active in this relationship (interview in year 3).

I wanted to introduce a new structure for the [SEN] team and create some new jobs and I spent a long time with two people - the personnel manager and a consultant we have in school and so I arranged to meet them and they have a big effect...I went to see [the former] in the first week and introduced myself because I knew a few weeks down the line I was going to need to speak to her about recruiting some new teaching assistants so I made friends with her pretty early on and we have had a very close working relationship with her ever since. So I spoke to them about this new structure that I wanted to create and I wrote a document and the way to submit it was that it needed to go to the headteacher but I needed to submit it via my line manager so I gave it to him and I politely chased up as to whether he had passed it on and it hadn't...so I took the decision that I am going to step over the line and email the headteacher directly and I am going to say 'I am terribly sorry if I have done the wrong thing but I have asked for this to be passed on and do you have any comments?' By this stage I had raised this at every weekly, or perhaps biweekly, line management meeting (interview in year 3)

Colleagues, some considered as peers due to when starting to join the school or through common roles, were also important to Johannes (see Figure 3) although it is striking that none of these were in the Science department.

Figure 3 about here

In addition to naming peers with whom he had regular communications from the Gatsby-funded network, those on the Fast-Track programme also featured in interviews with Johannes in both years 1 and 3; two within school, all beyond the science department, and some beyond school.

Johannes: There are certain people in school - other Fast-Track [teachers] in English and History - who I have a good rapport with (interview at the end of year 1).

Researcher: So what do you think started off those [indicating on the map external to school] relationships?

Johannes: Well they are all Fast-Track and I am too so I don't think it was just that but we ended up seeing more of each other thought Fast-track as well as science activities. I would say they were primarily the people from there.

Researcher: And do you still keep on with the formal Fast-track activities?

Johannes: Yes. I do. And also from Fast-Track there are others like [name] a historian who lives in London and I think physical location has something to do with it too (interview in year 3).

In part, the structure of the Fast-Track programme encouraged interaction but there was also an interplay with other chances to meet up and develop what Johannes refers to as a 'rapport' with these teachers. He reflected that this was easier to establish with those already on a programme with whom you can assume that the aspirations of others are somewhat similar to your own. The connections Johannes valued were not only with peers but also with other professionals;

Another link from Fast-Track is a lady and she is called a professional lead tutor and therefore my coach for Fast-Track but she is someone I have had far more contact than I needed to formally as she has always said to give me a call and so I call her once a term I guess usually for career advice (interview in year 3).

In addition Johannes cites Fast-Track as leading to other opportunities to make external to school connections (see Figure 6) such as Neuro-Lingustic Programme training and Leadership Pathways³.

Johannes' experiences seem to contrast with those of Rhiannon. He reported meeting much resistance and little encouragement to bringing in new ideas and the formal lines of support and management of his work had proved problematic. Determined to make a difference rather than conform to unspoken expectations he sought out like-minded colleagues both from within and beyond school for advice and support. Also exemplifying networking practices advocated by Nardi *et al*, (2000), Johannes was very conscious of the networking opportunities potentially available to him. He placed great importance on maintaining relationships with those

he respected and created new relationships, such as with the Headteacher, personnel manager and school consultant, when deemed useful. This awareness of networking Johannes reflected was heavily influenced by models observed whilst working in London and as used by his father.

Charles' case

In common with the other two cases, Charles was still in his original school by his third year of teaching. Like Johannes he was also on the Fast-Track programme. However he differs in that he had several years industrial experience before retraining as a teacher and some of his relationships and his approach to networking refer back to this time. When asked to represent his networks he started by mapping out four main quadrants; academic, training, social network, previous experience.

The networks represented by year three of teaching were rich, interconnected and drew on all four aspects he had identified. The within-school links, although valued by Charles, do not dominate this map in the same way as for either Rhiannon or Johannes.

At the start of his second term of his first year of teaching Charles explained that he believed he was coping well as a result of the support offered by relationships and structures in school. This made him feel safe, secure and welcomed as the following quotes exemplify;

Yes - peers and colleagues has always been fantastic. That's the nature of the school itself. It's superbly supportive. So those structures are fantastic and work very well (interview mid way through year 1).

Researcher: Could the structure and nature of the department have been improved to make you feel more welcomed?

³ A further programme run by the National College of School Leadership for aspiring leaders.

Charles: The structures are very clear. The head of department is very visible and it's clear that the issue go through him. It's not a secondary management system so you know where the line of communication is....I'm absolutely at home (interview at the end of year 1).

Within the department, that continues to be exceptionally supportive - both dealing with students and future projects. And the head is very supportive also....The beautiful thing about this department is that we have open doors on the corridor and people do wander in and out of each other's lessons, so that is helpful... Because of the nature of being a form tutor, you get to know people within a school - which is positive. And working with the literacy team gives you access to a wider range of people, and a healthy eating policy team. So those networks work quite well (interview at the end of year 1).

As this last quote indicates, even by the end of year 1 Charles was recognising the benefits of working across the school. He was also starting to feel frustrated by the lack of coherence and opportunity to develop either effective or meaningful relationships.

The only conflict maybe is with middle management - either heads of year or heads of department, and being completely aligned on discipline issues for example...And there are still a need of areas where I would like to go, like history, which I know is a fantastic department, but I've not made the contacts I should have made there (interview at the end of year 1).

Although Charles was well supported and inspired through intra-departmental links he also found support and inspiration from his external-to-school relationships of which he was very aware (even referring to them as networks) and expected that these would be increasingly important as the years progressed.

Researcher: Do you wish you had more time for reflection?

Charles: I think I do [find time] and am lucky that networks in and outside school are strong with supportive people (interview mid way through year 1).

Researcher: As the year has progressed, what have been the most important sources or types of support?

Charles: Head of Department probably. And for me the value and enjoyment has been through him. Colleagues have been good for exchanging ideas. But there are wider networks - Gatsby and Fast-Track - and I think they will become more important with time (interview at the end of year 1)

By the third year Charles's practice was being developed through involvement in a wide range of network activities; some self-initiated, such as a research project with Nottingham University, and derived from his active engagement with the Association for Science Education (ASE) and Science Enhancement Programme (SEP)⁴; some in collaboration with others, such as running a debating team (Debating Matters) with members of the History department, a youth business scheme (Young Enterprise)⁵ with members of the Business department and publishing (Cogbooks) with a peer in another school known through the Gatsby network. These all reflect Charles' range of passions and his aspiration to educate children in a holistic sense. By year 3 he had also embarked on a Masters programme, which had allowed him to continue to benefit from advice and resources from his former University lecturer (highlighted on Figure 6). This, he reflected, was perhaps his most valued link by year 3;

[name of lecturer] obviously will receive a wadge of information and then what she will do is say '[Charles], I think you should look at this' and really target things that way....Yes so linking with the MEd and of course with the Gatsby...but also it is also about quality and discussion...and the quality of that discussion is as rich as, now richer than pretty much anything else (interview in year 3).

⁴ The science enhancement programme was set up in 1998, by the [Gatsby Charitable Foundation](#), to develop innovative, low cost resources to enhance secondary science education, and provide free support for science teachers at all stages of their career. .

⁵ Young Enterprise is a UK business and enterprise education charity. In 2008 over 5,500 schools and colleges were participating in one of a range of programmes offered by the charity.

Charles reflected that, although his department were very accepting of the new ideas and practice he brought in from his external links, he felt keenly the tensions of working cross-departmentally such that he began to question his very identity as a teacher;

I worry that schools tend to set up little empires and is sometimes hard to see outside those, and perhaps silos, is a better way to describe them. Sometimes we seem loathe to say that actually this may sit better within another department or we might be able to use their expertise and there is almost an embarrassment that if we went to business [the department] and spoke them might be of value to us but we can't because we are a separate part of the school and we are all fighting to get the best GCSE results or the best kids for A level. In any large organisation I think that will happen...there is always this conflict of interests going on. Am I first and foremost a member of the science department and therefore my responsibilities are with my head of department and delivering whatever we decide to do here or am I first and foremost a teacher within [this school] and then driven by [the school] or am I actually above all that?

(interview in year 3).

Unlike Johannes, Charles valued his departmental links and was quickly active in bringing in new ideas to the department from his rich external network. He also sought to belong to a wider whole school community and developed projects, which led him to work cross-departmentally. This did not meet the normal expectations of the school and, while personally beneficial, left him feeling insecure in terms of his identity.

Themes arising from beginning teachers' experiences of networking

Trust and respect are key to building relationships

Relationships that embody trust, shared understanding and collective responsibility appear to be more important dimensions of interaction in the network than doing things together (Earl *et al*, 2006, p10).

This was the conclusion of external evaluators of the National College of School Leadership's programme of networked learning communities and has been borne out in this data. In a people-based profession such as education it is the quality of the relationships that appear to be most critical to teacher's feeling able to practice effectively and become part of their new workplace. The relationships are not always the formal ones offered to new teachers; of mentor and head of department for example and teachers have their own resources and skills to find others to fill or expand on the roles of reflective partner, emotional support and source of inspiration. This may be in part due to a disparity in expectations for formal support roles being offered as well as a lack of awareness of the likely tensions of new teachers with ideas to offer meeting colleagues unwilling or unable to encourage change and these reflections tie in with conclusions being drawn by others looking at the mentor-mentee relationship in particular (Rajuan *et al*, 2007; Barnett, 2008; Remington-Smith, 2007).

Who are these valued 'peers'?

This paper has struggled to identify conceptually who are acting as valued peers to these new teachers. Is the definition of a peer that two people qualified at the same time? There is evidence that these relationships can continue to be important if opportunities to maintain contact are offered/contrived and that these can be both within, or beyond, school. Is a peer someone in a similar role and therefore different people may act as potential peers as a teacher changes role? Rhiannon worked well with her in-school colleagues; teachers with a range of experience and status and enjoyed sharing ideas for practice with each of them while Johannes explained how his strongest relationships were with people who were operating at a similar status to himself. Or can these peers be any other teacher or professional you find you trust and respect who hold similar views to your own about teaching? This may account for the strong out-of-school connections that all three cases related including continued relationships with colleagues once they have left a school (for example see Figure 6) and is arguably possible more in the education profession than most where teachers, leaders and

educational professionals can all be seen to be working towards the same goals - pupil achievement – regardless of status or experience.

Conscious networking

The proactivity in using others to make things work as effectively as possible and in line with ideas and beliefs that these new teachers hold shows a real commitment to the teaching profession. It also shows conscious networking skills in the way outlined by Nardi *et al* (2000); network creation, management and activation.

Creation

All three teachers explained how they were able to make new connections from which they could benefit. In her third year Rhiannon was very excited about the new possibilities for her and her school in making links with the local Chemistry teachers; group (Figure 2 and 5). Johannes made a large number of separate links with teachers across the school with peers he found he could work productively (Figure 6) and Charles had made new cross-departmental links to help set up new projects for the benefit of students (Figure 7). These links, although less frequent than with those with whom they worked every day, represent the notion of the strength of weak ties (Granovetter, 1973).

Management

In network theory terms strength of a relationship relates to time spent, proximity and the depth and richness of the discourse (eg. Hakkarainen *et al*, 2004) and Rhiannon's experiences of working on courses and projects with colleagues show how these workplace practices facilitate regular contacts, which then strengthen and increase the value of the relationships. The value of these strong relationships cannot be assumed (eg. Fox *et al*, 2006) and to some extent this is shown by the poor quality of relationships Johannes refers to within his department. There are also dangers of inertia to the development of such close communities as have already been alluded to. Johannes and Charles both spoke of how they made regular contact with out of school peers

as part of a conscious strategy, At the end of the final interview, when asked how conscious of his network he was, Johannes replied;

Johannes: I think I just have a timer that pops up that I haven't spoken to someone. Last night I was speaking about [name of former PGCE student peer] to someone and so I gave him a call later last night (interview in year 3).

(Where multiple roles were enacted, such as peers being both in the Gatsby and Fast-Track programmes, or by a lecturer acting as facilitator for the Gatsby network and as Masters tutor, these links could be further strengthened. It appeared to be the in-school, beyond-department relationships that were serendipitous and reliant on ad hoc cross-school opportunities to work together.

Activation

Although there is little evidence in Rhiannon's case of activation of parts of her network for different ends both Johannes and Charles' rich networks were used by the teachers to meet different ends. Johannes talked about how he made sure that he made links with the personnel manager and school consultant to be able to activate these later to enact projects of personal interest. In a continuation of his reflections on his awareness of networking, Johannes explained;

Johannes: When the time arises that I need to contact someone I know pretty much where to go... if I need something then, just like this, I go through a map in my head of who should I speak to (interview in year 3).

Charles appeared to be operating in sub-networks simultaneously to follow various passions such as for debating, bringing in industrial experiences to school, developing business skills, updating his science teaching and engaging in research.

Implications for beginning teachers and those that support them

The implications of listening to these teachers talking about their experiences in authentic settings is that they are an opportunity for those supporting beginning teachers in school and beyond school to reflect on what it is that they value. What was striking was the rich nature of these networks, even for beginning teachers, with particularly strong external links. When these were not encouraged, such as in Rhiannon's case, she had to do all the work herself in keeping up to date and relying on local sources of knowledge. It was also notable that new teachers were not just using these less immediate networks for emotional support but also for advice, resources and inspiration and that these could therefore be viewed as a potential resource for the department and school rather than just personally (Fox & Wilson, 2008). Of the networking skills identified by Nardi *et al* (2000) activation of sub-networks seemed to be the least represented. It could be that the networks represented on the map were all simultaneously ongoing. This implies a big time commitment, particularly in the case of Johannes and Charles, and some support in thinking how best to manage such networks might be welcomed; especially in the early years of teaching.

It seems there is a need for schools to recognise the desire for new teachers to make connections beyond departments even if they have been welcomed into and developed strong links within the department but there remains questions as to how they find these respected peers. More research into what it is that makes two colleagues inspired to reflect together and collaborate is needed. These narratives also represent a desire to belong but with a call for schools to clarify the expectations of what it is that new teachers are perceived as belonging to in a school; be it the department, school or profession?

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Authors' Biographies

Alison Fox is a Research Associate at the University of Cambridge, having and has previously worked in a similar role at the Open University. She worked as the researcher attached to the 'network' group of the TLRP ESRC funded *Learning How to Learn* project and is now applying these ideas to the experiences of newly qualified science teachers. Her recent research experience has included case studies relating to teacher professional development and she is currently undertaking a Doctoral study of the professional learning of emergent school leaders.

Elaine Wilson is a senior lecturer at the Faculty of Education, University of Cambridge and a National Teaching Fellow since 2004. She has been an educator for nearly twenty years at both secondary school and higher education level. Most recently Elaine is researching the experiences of early career secondary school teachers with a focus on affective and social domains.

List of tables and figures for Teachers and Teaching submission:

Table 1: Coding frame applied to network map and interview data

Figure 1: Network map as drawn by Charles – a third year science teacher

Figure 2: Post-analytic representation of inter-departmental and beyond school links for Rhiannon – a third year Science teacher

Figure 3: Post-analytic representation of the network map drawn by Johannes – a third year Science teacher

Table 1: Coding frame applied to network map and interview data

Research sub-questions	Coding frame
What helps the networking of new teachers?	Affordances to links (those factors that support relationship building)
What hinders the networking of or is missing from the networks of new teachers?	Constraints to links (factors acting as barriers to relationship building or use) Absence of links (indicating either potential structural holes or constraints related to relationships linked to work by (eg. Burt 2001)
How have the new teachers been active in networking?	Proactivity with links (indication of conscious control and agency in network use linked to work by (eg. Nardi <i>et al</i> , 2000)
What travels between new teachers and others?	Transaction objects (representation of what passes between people such as knowledge or understanding across links) Material resources (physical traffic that passes across links)
Who is valued and why?	Value of links (indication of how feel about and need these links eg. Fox <i>et al</i> , 2006) External links (to highlight the beyond school elements reported) Prior links (to highlight the historical element of the networks being used)
How has networking affected the teachers?	Identity was <i>added</i> as it became apparent that many teachers spoke of using their links to get feedback about their worth and self-image.

Figure 1: Network map as drawn by Charles – a third year science teacher

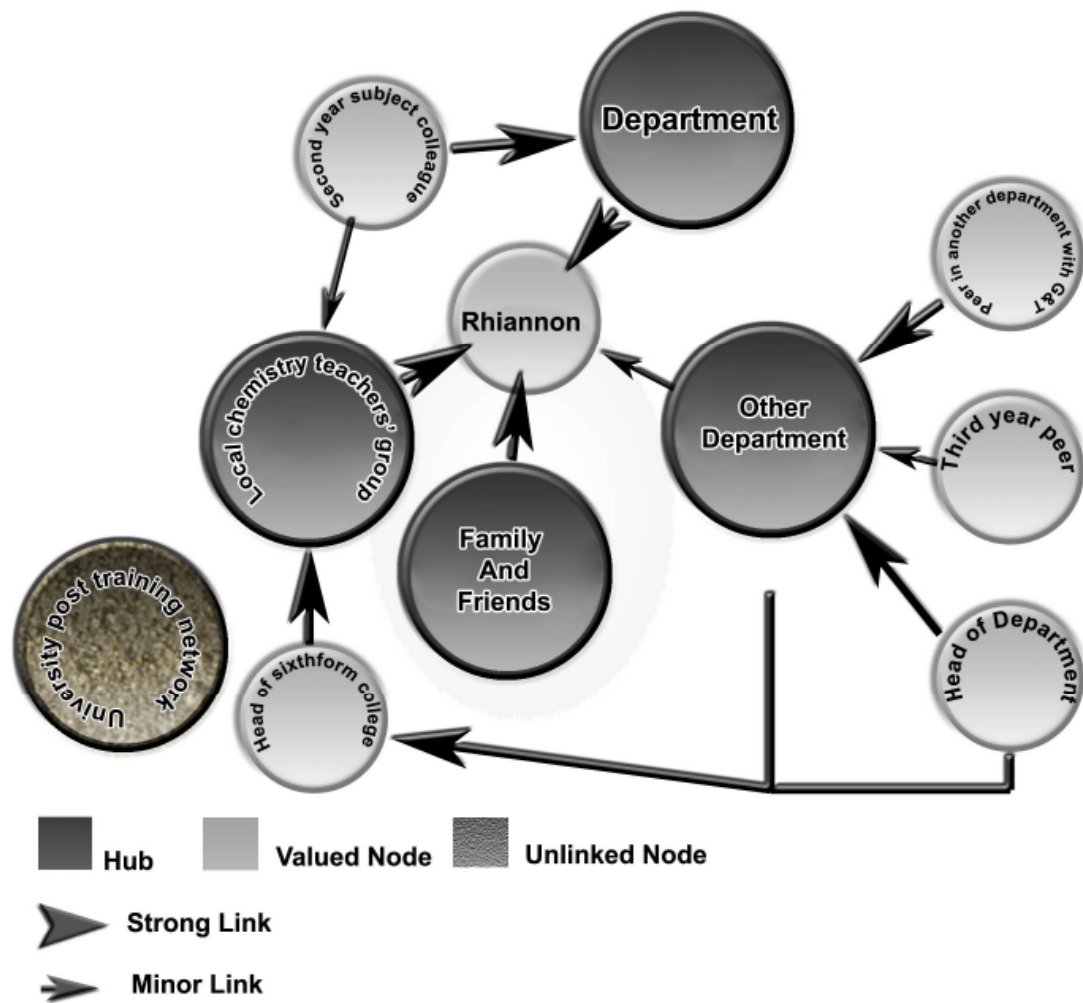


Figure 3: Post-analytic representation of the network map drawn by Johannes – a third year Science teacher

